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THE FLEAS OF EGYPT. HOPKINSIPSYLLA OCCULTA, A NEW GENUS
AND SPECIES OF FLEA PARASITIZING JERBOAS

(SIPHONAPTERA: LEPTOPSYLLIDAE)

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The U. S. Naval Medical Research Unit No. 3, based at Cairo, Egypt, United Arab Republic, has been engaged in a broad research program on infectious diseases in Egypt, and a major aspect of this undertaking has been the study by the Department of Medical Zoology on potential vectors and reservoirs of disease. As a result, this Department, under the direction of Dr. Harry Hoogstraal, has collected and examined thousands of mammals and ectoparasites, and has contributed greatly to our knowledge of the medical ecology of the region. Among the fleas thus made available for investigation is a genus and species new to science, apparently chiefly parasitizing the four-toed jerboa, *Allactaga tetradactyla*, and herewith described in one of a series of articles on the Siphonaptera of Egypt.

Family LEPTOPSYLLIDAE
Subfamily AMPHIPSYLLINAE

Hopkinsipsylla, gen. nov.

Diagnosis.—Near *Ophthalmopsylla* Wagner and Ioff, 1926, and *Paradoxopsyllus* Miyajima and Koidzumi, 1909, but readily separable from both by the following characters: 1) Eye (fig. 1, E.) deeply and broadly excised ventrally, the resulting sinus conspicuous; with the ventral margin weakly sclerotized, inapparent; double in appearance in that it is divided into a larger, anterior and dorsal portion which is lightly sclerotized, and a ventro-posterior darker portion somewhat reniform in shape; the demarcation between the two areas not clearly delineated. In *Ophthalmopsylla* the ventral margin of the eye is convex or biconvex, not broadly excised, and the pale anterodorsal portion is clearly demarcated in sharp

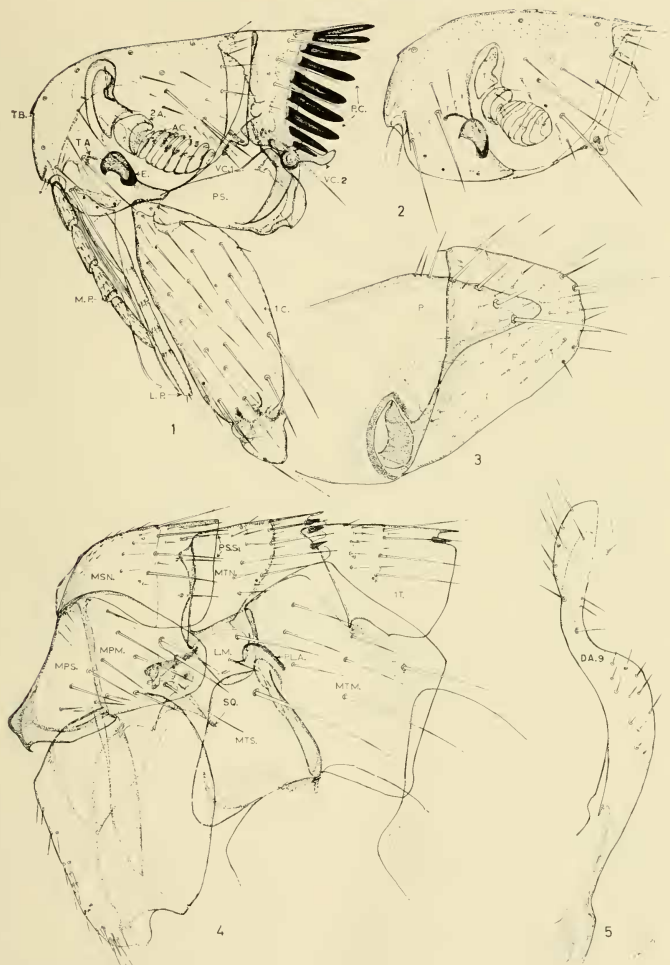
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contrast to the darker ventroposterior area, which is pyriform in shape. In *Paradoxopsyllus* the eye is not double in appearance, and is not so deeply excised and/or there is a sclerotized ridge delineating the ventral margin. 2) Male eighth tergum (fig. 6, 8 T.) reduced so that dorsally it scarcely extends beyond base of the immovable process (P.), while ventrally it fails to reach below the ventral margin of P. In the other two genera, the eighth tergum is relatively much larger, extending caudad to level of acetabulum or beyond, and sufficiently ventrad so as to cover much of the aedeagus. 3) Male eighth sternum (fig. 6, 8 ST.) proportionately and relatively very large, extending both caudad and dorsad to extreme margins of acetabulum of clasper, overlapping 8 T., and extending to its midline; with many (± 10) large non-marginal bristles, as large or larger than those of 8 T., and also with about an equal number of smaller bristles; essentially unmodified structurally. In *Paradoxopsyllus*, the 8 S. is proportionately and relatively smaller, normally not extending dorsad further than midline of body, generally in vicinity of the manubrium, and with the caudoventral angle no further posterior than level of apodemal strut; with only about four bristles and these ventral in caudomarginal region. While the 8 S. may be highly modified in *Ophthalmopsylla*, it is always smaller than in the new genus. 4) Male lacking acetabular bristles on process of clasper (fig. 13), whereas in the other two genera, there are typically one or two such bristles. 5) First pair of plantar bristles on fifth hind-tarsal segment (fig. 7) displaced mesad; the other plantar bristles much more lateral in position. In the other two genera, the plantar bristles are all lateral, their bases in line. 6) Bulga (head) of spermatheca (fig. 17, B.) shaped like a broad triangle with a rounded apex, instead of being gibbous or globose, or pyriform. 7) The homologue of the central tuber (trabecula centralis, T.C.) appearing as a large, lightly sclerotized, spherical structure lying above the eye, along the margin of the antennal groove, recalling *Peromyscopsylla* I. Fox, 1939, and *Cratynius* Jordan, 1933. The central tuber is distinct in *Ophthalmopsylla* and *Paradoxopsyllus*, much more sclerotized, smaller, and more ovate.

Generic Description.—Caput integrecipit (fig. 1, male and fig. 2, female). Eye broadly and deeply excised along ventral margin. Anterior arm of tentorium (T.A.) well-developed. Lacking a distinct sclerotized central tuber. Frontal tubercle (T.B.) distinct. Preantennal region with two rows of bristles and the first of these incomplete; at times with but one bristle representing an anterior third row. Second antennal segment (2 A.) with bristles short in both sexes. Antennal groove not extending onto propleuron. Postantennal region with only one complete row of bristles, that row caudomarginal. Labial palpi (L.P.) extending about four-fifths length of procoxae.

First vinculum or link-plate (VC. 1) received in distinct sinus of prosternosome. Pronotum narrower than length of spines of its combs with one row of bristles. Pronotal comb (P.C.) consisting of a total of about 18 narrow spines; near middle of comb, the spines are slightly longer than the breadth of pronotum at that level. Mesonotum (fig. 4, MSN.) with a total of about six or eight pseudosetae (P.S.S.). Metanotum (MTN.) with a few apical spinelets. Mesepisternum (MPS.) and mesepimere (MPM.) clearly differentiated. Lateral metanotal area (L.M.) distinct. Pleural region of metasternosome fitting into a well-sclerotized pleural arch (PL.A.). Procoxa (fig. 1, 1 C.) with many lateral bristles. Meso- and metacoxae with a submarginal, vertical row of thin bristles. Metacoxae (fig. 11) lacking a



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Fig. 1, head and prothorax of male; fig. 2, head of female; fig. 3, immovable process and movable finger of clasper; fig. 4, meso- and metathorax; first abdominal tergum (male); fig. 5, distal arm of male ninth segment.

patch of mesal spiniform bristles, but with scattered, thin, marginal, mesal bristles. Profemora with some thin, scattered, lateral, non-marginal bristles. Dorsolateral bristles on posterior (outer) margin of tibiae (figs. 8 and 9) largely paired, tibial "combs" therefore lacking. First pair of tarsal plantar bristles displaced mesad but nevertheless proximad of second pair (fig. 7). Metanotum and some of typical abdominal terga with apical spinelets. Unmodified terga with two rows of bristles, but first row usually somewhat reduced in number. Representative abdominal spiracles subovate. Both sexes with three antesensillary bristles per side, of which the middle one is the longest by far.

Male.—Eighth tergum (fig. 6, 8 T.) reduced, extending ventrad only to about level of seventh spiracular fossa (7 SPC.) and caudad not beyond level of proctiger. Eighth sternum (8 S.) large but relatively unmodified, about twice as broad (high) as long. Manubrium (fig. 13, MB.) long and narrow. Immovable process of clasper (figs. 3 and 13, P.) relatively unspecialized; higher than long; apex a broadly rounded triangle; the process directed dorsocaudad. Acetabular bristles absent. Clasper with movable finger or digitoid (F.) in shape of an inverted triangle with a broad apex and dorsocaudal angle rounded; lacking spiniform bristles. Tergal apodeme of ninth segment (T.AP.9) about $1\frac{1}{2}$ times as long as broad at midpoint; apically about twice as broad as proximally. Distal arm of ninth sternum (figs. 5 and 13, D.A.9) relatively simple in structure; elongate, scarcely broader than proximal arm (P.A.9), which is subequal in length; lacking spiniform bristles. Apodemal rod or tendon of ninth segment (AP.R.9) well-developed, following cephalic course of penis rods for most their length. Aedeagus (figs. 14 and 15) relatively unspecialized; apodeme relatively long and narrow; apical appendage absent; proximal spur present; wall of aedeagal pouch (P.W.) weakly sclerotized; the bay in the apodeme (B.L.PT.) due to a convexity in the lateral plates (L.PT.), not the middle plate of apodeme (M.PT.); sclerotized inner tube (S.I.T.) short, straight and relatively unarmored; with a conspicuous apicomedian sclerite (A.M.S.); crochets (CR.) much longer than sclerotized inner tube, conspicuous; penis rods (tendons of phallosome) (P.R.) partially coiled anteriorly.

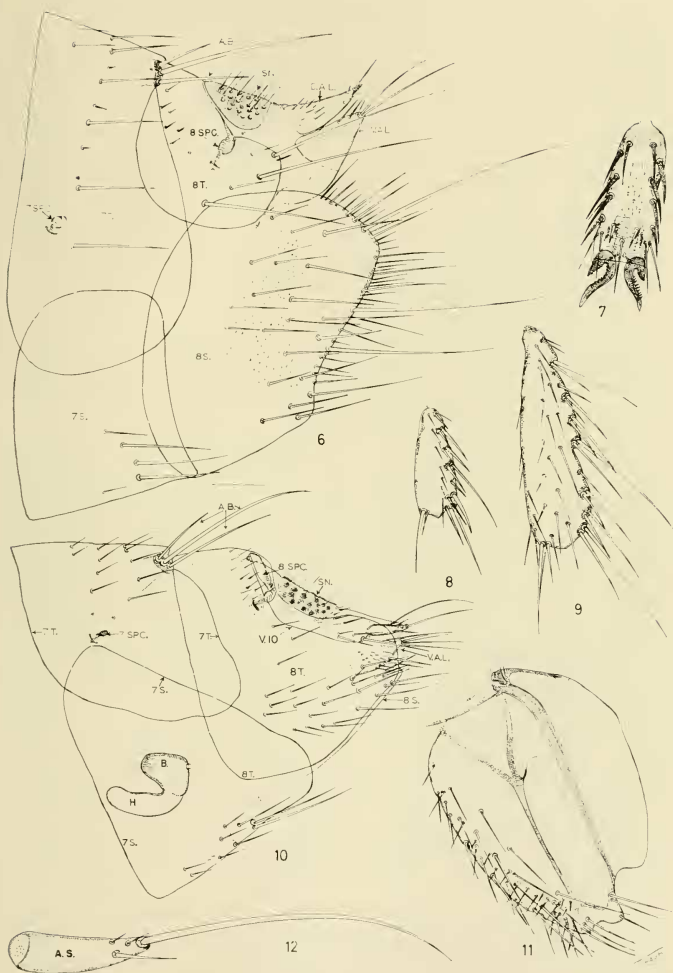
Female.—Spermatheca (figs. 10 and 17) with hilla (tail) (H.) much longer than bulga (B.), but its diameter only about half the height of hilla. Anal stylet (fig. 12, A.S.) slightly upcurved; more than $2\frac{1}{2}$ times as long as broad. Stout bristles on ventral anal lobe (figs. 16 and 17, V.A.L.) relatively straight.

The type species of the new genus is *Hopkinsipsylla occulta* sp. n., described below.

The genus is named for G. H. E. Hopkins, of the Zoological Museum, Tring, Herts., England.

***Hopkinsipsylla occulta*, sp. n.**

Types.—Holotype male and allotype female (B-50761-1) ex *Allactaga tetradactyla*, the four-toed jerboa; Egypt: Western Desert Governorate, 35 km. West of Mersa Matruh, 18 Feb., 1960, collector, H. Hoogstraal, for U. S. Naval Medical Research Unit No. 3 (Cairo). Paratypes as follows: 32 males and 34 females with same date or from nest of this particular individual jerboa; four males and two



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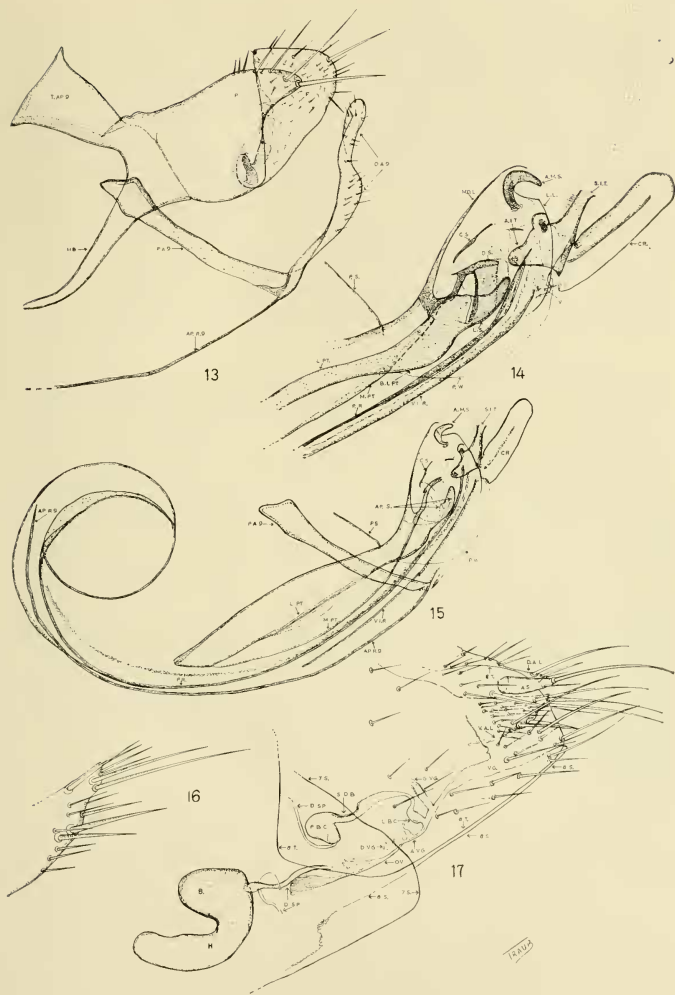
Fig. 6, seventh, eighth and tenth segments of male; fig. 7, metatarsus (male); fig. 8, protibia (male); fig. 9, metatibia (male); fig. 10, modified abdominal segments of female; fig. 11, metacoxa (male); fig. 12, anal stylet.

females (B-50766), *ibid.* but 19 Feb., 1960 one male and five females (B-50771) reared at NAMRU-3 Laboratory, on 23 Feb., 1960 from same nest as B-50761; three males and 13 females (B-50773), *ibid.* but reared 25 Feb., 1960; two females (B-50782) *ibid.* but reared 14 March, 1960; three males and 11 females (B-50763) ex a nest containing *Jaculus orientalis orientalis*, the greater Egyptian jerboa, otherwise with same data as holotype; one female (B-50765), same data as B-50763; two females (B-50764) ex nest of *Pachyuromys duprasi natronensis*, otherwise with same data as holotype; three females (B-10049), ex *Allactaga tetractyla*, Egypt; Western Desert Governorate, Mersa Matruh, 2 May, 1952, collector H. Hoogstraal; four females (B-22334) ex *Allactaga tetractyla*, Egypt; Western Desert Governorate, 5 mi. East of Sidi Barrani, 24 April, 1954, collector, H. Hoogstraal.

Holotype and allotype and two pairs of paratypes deposited in the collection of the U. S. National Museum, Washington, D. C. Paratypes deposited in the British Museum of Natural History (Tring, Herts.), the Chicago Natural History Museum, and in other institutions, as well as in the author's collection.

Head.—(fig. 1, male and fig. 2, female). Frontal tubercle (TB.) acute, median, conspicuous. Preantennal region with a row of two large bristles well anterior to eye; with a row of about four fairly small bristles at level of internal portions of stylets, uppermost of these bristles, bordering antennal groove, very small. Eye (E.) slightly more than twice as long as broad at midpoint; the ventral incision extending for a distance equal to about one fourth breadth of eye. Genal process quite broad and subtruncate apically. Maxillary lobe in shape of an acute elongate triangle, extending to approximate level of apex of third segment of maxillary palpus. Labial palpi (L.P.) 5-segmented, extending about four-fifths length of procoxae (1 C.); penultimate segment slightly more than one-half length of apical one, third segment slightly smaller than fourth. Maxillary palpi (M.P.) with third segment about one-half length of fourth. Scape of antenna with a few scattered, thin, apico- and dorso-marginal bristles. Second antennal segment (2 A.) with bristles shorter than width of segment. Club (A.C.) broadly ovate in outline. Postantennal region with longest bristle near ventro-caudal angle, slightly out of line with row; another large bristle submedian below midline; generally with two small thin bristles above the submedian large bristle and forming an equilateral triangle with it as an apex, directed ventrad; with one or two small bristles along antennal groove near midpoint and two or three more posterior in position. First vinculum or link-plate (VC. 1) elongate, cylindrical.

Thorax.—Pronotum with breadth from margin to base of spines of pronotal comb (P.C.) about two-thirds of length of spines of comb, as measured at middle level; bristles subequal in length to spines of comb, except for ventralmost, which is stout and very long nearly twice the length of the others. Pronotal comb consisting of a total of about 18 spines, whose bases form a shallow arc in outline, the arc facing cephalad; the middle spines about $4\frac{1}{2}$ or five times as long as broad at midpoint; these slightly concave; spines generally with emarginate bases. Second vinculum (VC. 2) with portion distad of center of spiracular plate sub-



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Fig. 13, male ninth sternum and clasper; fig. 14, apex of aedeagus; fig. 15, aedeagus; fig. 16, ventral anal lobe of female proctiger; fig. 17, female modified abdominal segments (enlarged).

equal in length to that of pronotum, as measured above. Mesonotum (fig. 4, MSN.) with two distinct rows of bristles; with a broad flange, about three-fifths breadth of mesonotum proper. Mesonotal flange with four pseudosetae (PS.S.). Mesepisternum (MPS.) with about four bristles in ventrocaudal region, of which the uppermost is median, but near the sclerotization separating MPS. from the mesepimere (MPM.); with three very thin bristles near anterodorsal angle. Mesepimere (MPM.) with eight or nine bristles, of which generally three are ventromarginal. Metanotum (MTN.), together with its flange, about subequal in length to MSN., with two rows of bristles; the anterior row dorsally preceded by one or two dorsal bristles. Metanotal flange with three apical teeth per side, the teeth in recessed sinuses so that their apices are virtually in line with margin of flange. Lateral metanotal area (L.M.) broader (higher) than long. Metepisternum (MTS.) with one large bristle in posterodorsal region; squamulum (SQ.) relatively elongate. Metepimere (MTM.) generally with seven or eight bristles, frequently arranged 3(4)-3-1. Spiracular fossa of metepimere ovate, oblate, slightly longer than broad.

Legs.—Metaeoxa (fig. 11) with about 11-14 thin submarginal and submedial lateral bristles; with about 13-17 small, thin, submarginal mesal bristles, mainly on apical half. Profemur with about eight or nine small, thin, scattered, non-marginal lateral bristles. Meso- and metafemur with two submarginal lateral bristles, subventral in position; these segments also with two subapical bristles on ventral margin. Protibia (fig. 8) with five pairs of stout dorsomarginal bristles in notches; the basal bristle single, and with another single bristle between third and fourth pair; at times (especially in female) with an additional single stout bristle between first and second pair. Mesotibia with seven pairs of stout dorsomarginal bristles (excluding most proximal pair, which consists of one stout and one thin bristle); at times (especially in female) with additional single dorsomarginal bristles as follows: one between first and second pairs and one between fourth and fifth, chaetotaxy thereby agreeing in this respect with metatibia (fig. 9). Meso- and metatarsi with one distomarginal bristle on third segment extending beyond apex of fourth segment. Metatarsus with at least one apical bristle of second segment extending beyond apex of third. The displaced first pair of plantar bristles on last tarsal segment virtually subequal in size to the four lateral plantar bristles but straight, not somewhat convex, as shown for metatarsus in fig. 7. Measurements (in microns) of tibiae and segments of tarsi (petiolate base deleted) of holotype:

Leg	Tibia	Tarsal Segments				
		I	II	III	IV	V
Pro	198	72	75	51	39	93
Meso	315	129	114	75	39	102
Meta	396	306	186	111	57	120

Abdomen.—First tergum (fig. 4, 1 T.), including anterior phragma and caudal flange slightly longer than metanota including its phragma and flange; with two rows of bristles and an apical, recessed spinelet per side. Basal sternum with about three well-separated ventromarginal bristles, the caudalmost large; with one or two submedian bristles. Terga 1, 2, and, in male especially, sometimes 3,

with one apical spinelet per side. Unmodified terga in both sexes with two rows of bristles; the posterior row of long bristles, extending slightly below level of subovate spiracular fossa (fig. 6, 7 SPC.), the anterior row short, of one to three smaller bristles and extending much less than half way down to spiracle. Typical sterna in male, on each side, with a vertical row of about three (or four) approximated large bristles, the lowest ventromarginal, preceded by one or two submarginal smaller ones; in female the row generally consists of four large bristles preceded by two groups of two smaller ventromarginal ones. Antsensiliary bristles in each sex (figs. 6 and 10, A.B.) consisting of three bristles of which the middle one is somewhat more than twice the length of the upper one and slightly less than twice that of the lower one; in female the lowest bristle somewhat longer than in male.

Modified Abdominal Segments—Male.—Eight tergum (fig. 6, 8 T.) with about six to seven small thin bristles on dorsal anterior third of segment; with three long bristles in a row as follows: one median, subventral; one at dorso-caudal angle and the third between these; with one smaller bristle between ventral two long ones and one dorsomarginal small bristle immediately preceding and, at times, also caudad to the dorsalmost long one. Eighth spiracular fossa (8 SPC.) small, subovate, thin (especially the portion extending dorsad). Eighth sternum (8 S.) with a conspicuous fringe-like row of dorsocaudal, marginal, small bristles and three long caudomarginal bristles of which one is at dorsocaudal angle, one median and one subventral; with a submarginal row of four or five small bristles along lower half of caudal margin and a row of seven to eight such bristles on posterior fourth, and a group of about seven to ten bristles in two irregular rows, largely submedian, above midline and ranging to near caudal margin. Eighth sternum spiculate submedially; caudal margin convex above and becoming somewhat convex subventrally.

Immovable process of clasper (figs. 3 and 13, P.) produced into a snout-like projection with a broad base; its height (measured from transverse suture above base of manubrium) greater than its morphological length—about twice as high as broad at midpoint; its snout bearing three long dorsal or subdorsal bristles and one subapical ventromarginal bristle. Clasper with movable process or finger (F.) roughly ham-shaped; about $2\frac{1}{2}$ times as long as broad at midpoint; with cephalic and dorsal margins quite straight for most their lengths; margin broadly rounded dorsocaudally; with a fairly long bristle at junction of dorsal and caudal margins; this preceded by a small marginal bristle and with a small dorsomarginal bristle near cephalodorsal angle; with four to six small bristles on distal third of caudal margin; with many small, thin bristles, scattered over mesal surface. Manubrium (fig. 13, MB.) about $10\frac{1}{2}$ times as long (measured from suture on P. to apex) as broad at midpoint, its margins relatively straight and tapering, but curving caudad subapically. Ninth sternum with proximal arm (P.A. 9) narrow, about 12 times as long as broad at midpoint; margins subparallel except for expansion near apical end, which is produced in the shape of an equilateral triangle with rounded angles, whose base is more than twice the breadth of P.A. 9. Distal arm of ninth segment (D.A. 9 and fig. 5) long and narrow; biconvex caudally, due to a deep, broad sinus at apical fourth; apical portion with a row of about six small, thin cephalomarginal bristles, the uppermost at dorsal margin;

with one caudomarginal bristle near midpoint of apical lobe; with one to three such bristles in region of sinus, proximal portion with about 12 small, thin, scattered bristles, about half of which are non-marginal.

Aedeagus (figs. 14 and 15) with lateral plates (L.P.T.) beyond apodemal strut (A.P.S.) more than six times as long as broad at midpoint. Proximal spur (P.S.) fairly straight, about one fourth the length of lateral plates. Crescent sclerite relatively straight and thin. Sclerotized inner tube (S.I.T.) about twice as broad near base as near apex; abruptly narrowed near midpoint; distal half with sides subparallel. Armature of inner tube (A.I.T.) represented primarily only as a bulge at dorsobasal region. Apicomedian sclerite (A.M.S.) distinctive as a broad crescentic or semicircular structure. Crochets (CR.) conspicuous as a pair of long oblong lobes with rounded apices, extending well beyond end-chamber; about four times as long as broad; with sclerotized submedian ridge extending most of the length. Ventral intramural rod (V.I.R.) terminating in a weakly-developed vesicle (V.). One of penis rods (tendons of phallosome) (P.R.) typically making a complete cephalic loop, the other a partial one.

Sensilium or pygidium (fig. 6, SN.) very flat dorsally, longer than broad; with about 18-21 sensory pits per side. Dorsal anal lobe of proetiger (D.A.L.) conical, with a patch of about 8-12 small proximal and submedian bristles and four to six distal ones, of which one or two near apex are the longest. Ventral lobe of proetiger (V.A.L.) with four to six dorsomarginal bristles, and one or two long apical ones; ventral margin rather well-sclerotized.

Female.—(figs. 10 and 17). Seventh sternum (7 S.) with apical margin quite straight and subvertical; caudal margin mainly at an angle of about 45° with horizontal axis, essentially straight except for a slight subventral sinus; caudo-ventral angle broadly rounded, lacking submedian or caudal bristles; with two virtually contiguous ventromarginal long bristles near apical third, preceded by a smaller slightly more dorsal bristle; with three or four small ventromarginal bristles on proximal two-thirds, and three or four submarginal small bristles. Eighth tergum (8 T.) with many small bristles preceding eighth spiracular fossa (8 SPC.); two subdorsal ones near ventral margin of tenth segment (V. 10); with about 18-20 submedian bristles scattered over surface, some below ventral anal lobe (V.A.L.); in addition with four somewhat longer ventromarginal ones near caudal margin; with a patch of about 14 small, thin, mesal bristles anterior and laterad to ventral anal lobe. Tenth segment with about seven small subdorsal and submedian bristles caudad to sensilium; its ventral margin (V. 10) with one long bristle at ventrocaudal angle, immediately next to base of anal stylet (A.S.); this bristle preceded by a fairly long, submarginal one and two smaller ones in a vertical row. Dorsal anal lobe of proetiger (D.A.L.) with a group of four or five subapical bristles, of which one is very long. Anal stylet (A.S. and fig. 12) slightly more than thrice as long as broad at midpoint; with a very long, apical bristle, a subapical bristle near ventral margin and two very small dorsal ones. Ventral anal lobe (V.A.L. and fig. 16) with a conspicuous sinus subapically, flanked anteriorly by a pair of stout contiguous bristles and apically by a pair of long ones of which one is mesal; with three thin apical bristles and one long dorsal one; the margin of the sinus bearing one fairly stout mesal bristle and one thin bristle; proximal portion of ventral margin generally with three bristles; with three submarginal bristles, one near ventral large pair and two near sinus.

Spermatheca (figs. 10 and 17) with bulga (head) (B.) somewhat orbiculate, but oblate, with ventral margin flat, and much broader than the rounded dorsal margin; about 1.6 times as high as broad at midline. Hilla (tail) (H.) of spermatheca long and broad; more than twice as long as broad, and more than 1.5 times as long as bulga is high; apex broadly rounded; lacking an apical papilla; fairly well delineated from bulga. The sclerotized duct of the bursa copulatrix (fig. 17, S.D.B.) the most conspicuous part of this organ, appearing as annulated crescent. The dilated portion of the bursa copulatrix, herein called the perula (P.B.C.) weakly sclerotized, apically somewhat biconvex above the point of entry of the duct of the spermatheca (D.SP.). The portion of the bursa copulatrix entering the vagina, herein designated the lura (L.B.C.), somewhat dilated.

Remarks.—The specific name of this species was suggested by the fact that intensive search over a period of years was required before the males were discovered and an adequate number of specimens collected for description. The first specimens taken in 1952 by Harry Hoogstraal were four females from the four-toed jerboa, *Allactaga tetradactyla*. He obligingly returned to seek more material upon being notified that these specimens undoubtedly represented an undescribed genus of flea, and although *Allactaga* are difficult to collect in Egypt, he and his colleagues managed to examine more than 200 during the next eight years without collecting any *Hopkinsipsylla*. The author also failed to get additional material during a short collecting trip kindly arranged by the Division of Medical Zoology of NAMRU-3.

The long series ultimately collected in 1960, cited above as types, indicate that this species of flea may be a nidicolous form, perhaps most prevalent during the winter months, and even then primarily in nests. In this connection it may be noteworthy that the only species of host to be infested with this flea was the four-toed jerboa, *Allactaga*, and that even though Dr. Hoogstraal and his associates examined over 500 specimens of *Jaculus jaculus*, the lesser Egyptian jerboa, and 500 *Jaculus orientalis orientalis*, the greater Egyptian jerboa, no specimens were taken from any of these animals (Hoogstraal and Traub, in preparation). The only records of *Hopkinsipsylla* from sources other than *Allactaga* or their nests were 14 specimens from a nest containing *Jaculus* and two from the nest of *Pachyuromys*, in the type locality, and it is possible that these nests may once have harbored *Allactaga*. It also seems significant that many of the above mentioned *Jaculus* were from other areas, even from the well-studied Giza district, and that many nests of *Jaculus*, as well as many other rodents, were carefully examined without finding any *Hopkinsipsylla*. It therefore appears that *Allactaga* is the true host of *Hopkinsipsylla*.

This new genus of flea is apparently most closely allied to *Ophthallopsylla*, a genus which has been found thus far only in the desert and semi-desert regions of Europe and Asia, where it parasitizes *Allactaga* and related rodents. It would be premature to postulate, on the basis of available evidence, that *Hopkinsipsylla* may have re-

placed or was evolved from *Ophthalmopsylla* in the North African habitats of jerboas, because too little is known of the Siphonapteran fauna of that part of the world. It may be that *Ophthalmopsylla* occurs in Tunis or Algeria and yet be absent from Egypt. If so, it would parallel the discontinuous distribution of another genus of flea infesting desert rodents in the Mediterranean-Siberian region, *Coptopsylla* Jordan and Rothschild, 1908, which, as shown by Hopkins and Rothschild (1956), is known both from regions west of Egypt and in Turkestan, etc., but has not been found in Egypt itself, despite the intensive collecting of Harry Hoogstraal's unit.

SUMMARY

Hopkinsipsylla occulta, a new genus and species of flea from *Allactaga tetradactyla* and from the nests of *Allactaga* and other jerboas in the Mersa Matruh-Sidi Barrani area of the Western Desert Governorate of Egypt, is described and figured. *Hopkinsipsylla* is close to *Ophthalmopsylla* and *Paradoxopsyllus*, but is separable in that the eye is ventrally broadly and deeply excised, not convex or biconvex; the eighth tergum is greatly reduced so that dorsally it scarcely extends beyond the movable process; the male lacks acetabular bristles on the process of the clasper, among other differences. The collection-data suggests that this flea is nidicolous and perhaps seasonal (late winter and early spring) in nature.

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

A.B., Antesensillary bristle; **A.C.**, Club of antenna; **A.I.T.**, Armature of sclerotized inner tube; **A.M.S.**, Apicomedian sclerite of aedeagus; **AP.R.9**, Apodemal rod of ninth sternum; **AP.S.**, Apodemal strut of aedeagus; **A.S.**, Anal stylet; **B.**, Bulga (head) of spermatheca; **B.L.P.T.**, Bay or ventral convexity of lateral plate of aedeagal apodeme; **CR.**, Crochet of aedeagus; **D.A.L.**, Dorsal anal lobe of proctiger; **D.A.9**, Distal arm of male ninth sternum; **D.SP.**, Duct of spermatheca; **E.**, Eye; **F.**, Movable finger or digitoid of clasper; **H.**, Hilla (tail) of spermatheca; **L.B.C.**, Lura of bursa copulatrix; **L.M.**, Lateral metanotal area of metathorax; **L.P.**, Labial palpus; **L.P.T.**, Lateral plate of aedeagal apodeme; **M.P.**, Maxillary palpus, **M.P.T.**, Middle plate of aedeagal apodeme; **MB.**, Manubrium; **MPM.**, Mesepimere; **MPS.**, Mesepisternum; **MSN.**, Mesonotum; **MTM.**, Metepimere; **MTN.**, Metanotum, **MTS.**, Metepisternum; **P.**, Immobile process of clasper; **P.A.9**, Proximal arm of male ninth sternum; **P.B.C.**, Perula—dilated portion of bursa copulatrix; **P.C.**, Pronotal comb; **P.R.**, Penis rod; **P.S.**, Proximal spur of aedeagus; **P.W.**, Wall of aedeagal pouch; **PL.A.**, Pleural arch of metathorax; **PS.S.**, Pseudosetae; **S.D.B.**, Sclerotized duct of bursa copulatrix; **S.I.T.**, Sclerotized inner tube of aedeagus; **SN.**, Sensillum; **SQ.**, Squamulum; **T.A.**, Arm of tentorium; **T.AP.9**, Tergal apodeme of ninth segment; **T.C.**, Trabecula centralis; **TB.**, Frontal tubercle; **V.**, Vesicle of aedeagus; **V.A.L.**, Ventral anal lobe of proctiger; **V.I.R.**, Ventral intramural rod of aedeagus; **V.10**, Ventral margin

of female tenth segment; **VC. 1**, First vinculum; **VC. 2**, Second vinculum; **1 C.**, Procoxa; **1 T.**, First tergum; **2 A.**, Second antennal segment; **7 S.**, Seventh sternum; **7 SPC.**, Spiracle (fossa) of seventh segment; **8 S.**, Eighth sternum; **8 SPC.**, Spiracle (fossa) of eighth segment; **8 ST.**, Eighth sternum; **8 T.**, Eighth tergum.

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- Hopkins, G. H. E. and M. Rothschild.** 1956. An Illustrated Catalogue of the Rothschild Collection of Fleas (Siphonaptera) in the British Museum (Natural History). Coptosyllidae, Vermipsyllidae, Stephanocircidae, Ichnopsyllidae, Hypsophthalmidae and Xiphiopsyllidae. Vol. II, xi + 445 pp., figs. 1-707, 32 pls.

BOOK REVIEW

THE INSECT FACTOR IN WOOD DECAY, by Norman E. Hickin, 1963, 336 pages, 263 figures, 2 col. pls. Hutchinson & Co., London and New York. Price: £2 S10.

Dr. N. E. Hickin, a distinguished British entomologist, has written a general account of insects as factors in wood destruction, particularly to timber indoors. Insects are by far the most important animal group causing deterioration. One of the results of the great upsurge of the use of imported softwoods into Britain after the first World War was the increase in damage to buildings by the anobiid beetle *Anobium punctatum*, or wood worm. Control work is costing the public £10 million annually. Of course this anobiid has world-wide distribution. Details are given on its appearance and habits. Dr. Hickin is an authority on this beetle.

Other species of British anobiids are discussed, particularly the "death-watch beetle" *Xestobium rufovillosum*, which is also injurious in the U. S. Its sex noise, or rapping on wood, was supposed to predict death.

Lyctidae and Bostrichidae, also injurious powder-post beetles, the habits and damage by various species are given in detail.

Buprestid beetles, the wharf borer and certain wood-boring weevils, which cause damage to wooden structures in both Britain and the U.S. are briefly described and their habits given.

Next to the anobiid beetles, the cerambycids are given a great deal of attention, with description and keys. *Hylotrupes bajulus*, called the old house borer in the U. S. where it is very injurious, is as yet only local in Britain. Britain has 64 species of cerambycid beetles.

Termites do not occur in Britain, but have been accidentally introduced several times, and Dr. Hickin has investigated existing legislation to prevent importation in bringing live termites for study to the remarkable Rentokil laboratory in Sussex from France.

Wood-boring wasps, bees, ants and moths which occasionally damage structures are briefly noted as being injurious elsewhere.

To summarize Jan.-Dec. 1961 the comparative importance of wood-boring insects in Britain: woodworm 77.4%, death-watch 5.0%, *Lyctus* 1.2, weevils 4.1, cerambycids 0.5, number of surveys 18,015.

Control, after sanitation, is the application of an insecticide proven effective in the laboratory for each type of borer.—THOMAS E. SNYDER, *U. S. National Museum, Washington, D. C.*